TIME-VARIABLE SUMMIT CRATER RADIANCE AT MT. ETNA

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The radiant energy output of summit craters at Mt. Etna (Italy) has been observed using Landsat Thematic (TM) data for the period 1986-1995. The compiled data set consists of 35 TM scenes of the Etna summit, including the Northeast crater, La Bocca Nuova, La Voragine, and the Southeast crater. A variety of systematic time-variable behavior was noted, and of particular interest was the 1991-1993 eruption, where at least 12 clear-weather TM frames were acquired.

Summit crater time-variable radiance preceding the eruption was systematic and significant. Generally, the average maximum radiance of the four summit craters increased systematically during the 800 days preceding the 1991-1993 eruption. This behavior reached a maximum in the month preceding the eruption, then rapidly receded to a low background value, once the flank eruption commenced. In addition, intercrater radiance was phased and systematic. Such systematic behavior may be useful in monitoring pre-eruption activity crescendos at Etna and elsewhere, and may be indicative of coordinated magma movement within summit conduits.

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